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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/584,434	09/07/2007	Bryan S. Shelton	GLOZ 200202US01	1955
27885	7590	03/30/2010		
FAY SHARPE LLP 1228 Euclid Avenue, 5th Floor The Halle Building Cleveland, OH 44115			EXAMINER GHYKA, ALEXANDER G	
			ART UNIT	PAPER NUMBER
			2812	
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			03/30/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/584,434

Applicant(s)

SHELTON ET AL.

Examiner

ALEXANDER G. GHYKA

Art Unit

2812

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 January 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 and 11-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 and 11-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 June 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB-06)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Applicants' response of January 4, 2010 has been considered and entered in the record. As noted by Applicants, the Preliminary amendment of 10/23/2008 was not considered in the previous Office Action. The rejections of the previous Office Action are withdrawn. The following rejections are made, which address the claims as submitted in the Preliminary Amendment of 10/23/2008.

Claims 1-8 and 11-20 are now under consideration.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-8 and 11-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over CN1215503A (as relied on Chinese first Office Action submitted by Applicants) in view Camras et al (US2002/0093023) and Urbanek (US 2005/0042845).

With respect to Claim 1, CN 1215503A discloses a method for fabrication of a flip-chip light emitting diode together with the following technical features: the method includes the following steps, a) forming epitaxial layers on a sapphire substrate 30 to produce an epitaxial wafer; b) fabricating a plurality of light emitting diode devices on the epitaxial wafer; c) dicing the epitaxial wafer and the sapphire substrate 30 to generate at least one separated device die, for example; the device die 1, said device die 1 including at least one light emitting diode device and a portion of the sapphire substrate 30; d) flip-chip bonding the device die 1 to a mount 2, said flip-chip die 1 connected to the electrodes 7 and 8 (equivalent to the bonding pad in Claim 1) on the mount 2 by p electrode 5 and n electrode 6 of this die, and further fixing the device die 1 to the mount 2. See lines 10-24, page 20; lines 14-23, page 23; line 5, page 24 to line 2, page 26 of the Specification and Figures 9A, 9B, 13 and 15B of CN 1215503A .

CN 1215503A differs from the present Claims in that it does not disclose step e) removing some of the growth substrate from the device die by laser lift off.

US 2002/0093023A1 also discloses a method for fabrication of a flip-chip light emitting diode device together with the following technical features: fixing the die of the light emitting diode to the submount 130 by the solder connections 132 and 136 and

removing at least some of the substrate 117 for its benefit of increasing the light emission intensity of the light emitting diode device. See paragraphs 0052, 0060, 0063-0069 of the Specification; and Figs. 4, 7A-7F and 8 of US 2002/0093023 A1.

Urbanek also discloses a method for fabricating an LED which comprises the deposition of an epitaxial layer on a sapphire growth substrate, and discloses a laser lift off method for removing the growth substrate. See page 8, paragraph 106 and page 10, Claim 1.

It would have been obvious for one of ordinary skill in the art to remove at least some of the growth of the substrate in CN 1215503A, for its known benefit in the art of increasing the light emission intensity of the light emitting diode device as disclosed by US 2002/0093023, using the laser lift off process as disclosed by Urbanek. The use of a known method, laser lift off, for its known benefit, removal of the growth substrate, would have been *prima facie* obvious to one of ordinary skill in the art. As all of the references pertain to the formation of light emitting diodes on sapphire substrates, a *prima facie* case of obviousness is established.

With respect to Claim 2, CN 1215503A further discloses as performing step d) , further providing an UV curable insulating resin 16 (equivalent to the support material in Claim 2) interposed between the mount 2 and the device die 1. See page 24, line 5 to page 26, line 2, and Figure 13 of CN 1215503A.

With respect to Claim 3, CN 1215503A further discloses as performing step d) further providing an UV curable insulating resin 16 (equivalent to the support material in

a flowable forming Claim 3) interposed between the mount 2 and the device die 1, the insulating resin 16 contacting with the device chip 1 and the mount 2, and irradiated with UV light for curing so as to support the device die 1. See page 24, line 5 to page 26, line 2 and Figure 13.

With respect to Claim 4, the removal of excess underfill material, for its benefit in optimizing the thickness of the underfill layer would be obvious to one of ordinary skill in the art. The Examiner takes Official Notice that the use of underfill layers are known in the art in the formation of flip chips. Moreover, Urbanek disclose the use of epoxy layers. See page 5, paragraph 65. The Examiner takes Official Notice that epoxy is known in the art as an underfill material.

With respect to Claim 5, CN 1215503A discloses a UV curable insulating resin, which is not conductive as required by the afore mentioned Claim. See page 24, line 5 to page 26, line 2 and Figure 13.

With respect to Claim 6, Urbanek discloses removing substantially the entire portion of the growth substrate from the device by laser lift-off applying an excimer laser. See page 3, paragraph 50 of Urbanek.

With respect to Claim 7, Urbanek discloses illuminating the portion of the growth substrate included on the device with laser light generated by the excimer laser. See page 3, paragraph 50 of Urbanek.

With respect to Claim 8, Urbanek discloses ultraviolet light. See the Abstract.

With respect to Claim 11, Urbanek discloses applying laser light selected to degrade an interface between the sapphire growth substrate and the epitaxial layer. See page 6, paragraph 83.

With respect to Claim 12, Urbanek discloses elevating a temperature whereby the gallium metal melts and allows the sapphire growth substrate to be removed. See page 9, paragraph 119.

With respect to claim 13, Urbanek discloses cleaning residual gallium metal from a surface exposed by removal of the sapphire growth substrate. See page 5, paragraph 72.

With respect to Claim 14, Claim 14 is rejected for the reasons as discussed above with respect to Claim 1. Moreover, all three references disclose the use of sapphire growth substrates as discussed above. See paragraph 32 of Camras et al US 2002/0093023 and Claim 1 of Urbanek.

With respect to Claim 15, Urbanek discloses applying laser light selected to degrade an interface between the sapphire growth substrate and the epitaxial layer. See page 6, paragraph 83.

With respect to Claim 16, Urbanek discloses elevating a temperature whereby the gallium metal melts and allows the sapphire growth substrate to be removed. See page 9, paragraph 119.

With respect to claim 17, Urbanek discloses cleaning residual gallium metal from a surface exposed by removal of the sapphire growth substrate. See page 5, paragraph 72.

With respect to Claim 18, Urbanek disclose the use of epoxy layers. See page 5, paragraph 65. The Examiner takes Official Notice that epoxy is known in the art as an underfill material.

With respect to Claim 19, Urbanek discloses applying a coating material (10) to the device die prior to the removing of the sapphire growth substrate. See page 9, paragraph 120.

With respect to Claim 20, Urbanek discloses removing the coating material (10) after the laser liftoff process is completed. See page 9, paragraph 120.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ALEXANDER G. GHYKA whose telephone number is (571)272-1669. The examiner can normally be reached on Monday through Friday 9 to 5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Charles Garber can be reached on (571) 272-2194. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

AGG

March 27, 2009

/Alexander G. Ghyka/

Primary Examiner, Art Unit 2812